



US005633435A

United States Patent [19]

Barry et al.

[11] Patent Number: **5,633,435**[45] Date of Patent: **May 27, 1997**[54] **GLYPHOSATE-TOLERANT 5-ENOLPYRUVYLSHIKIMATE-3-PHOSPHATE SYNTHASES**[75] Inventors: **Gerard F. Barry**, St. Louis; **Ganesh M. Kishore**, Chesterfield; **Stephen R. Padgett**, Grover; **William C. Stallings**, Glencoe, all of Mo.[73] Assignee: **Monsanto Company**, St. Louis, Mo.[21] Appl. No.: **306,063**[22] Filed: **Sep. 13, 1994****Related U.S. Application Data**

[63] Continuation-in-part of Ser. No. 749,611, Aug. 28, 1991, abandoned, which is a continuation-in-part of Ser. No. 576,537, Aug. 31, 1990, abandoned.

[51] Int. Cl.⁶ **A01H 4/00; C12N 15/82**[52] U.S. Cl. **800/205; 800/250; 800/DIG. 17; 800/DIG. 43; 800/DIG. 26; 536/23.2; 47/58; 435/320.1; 435/172.3; 435/413; 435/411; 435/414; 435/415; 435/418; 435/417; 435/416**[58] Field of Search **800/205, DIG. 43, 800/DIG. 17, 250, DIG. 26; 536/23.2, 23.4, 23.7; 435/320.1, 172.1, 172.3**[56] **References Cited****U.S. PATENT DOCUMENTS**

4,769,061	9/1988	Comai	504/206
4,971,908	11/1990	Kishore et al.	435/172.1
5,094,945	3/1992	Comai	435/172.3
5,310,667	5/1994	Eichholtz et al.	435/172.3

FOREIGN PATENT DOCUMENTS

0 193 259 9/1986 European Pat. Off. 800/205

OTHER PUBLICATIONS

Comai et al. (1988) *J of Biol. Chem.* 263:15104-15109.
 Fillatti et al. (Jul. 1987) *Bio/Technology* 5:726-730.
 Fitzgibbon (Dec. 1988) Ph.D. Thesis University Microfilms International, (1989).
 Griffin and Gasson (1995) *Mol. Gen. Genet.* 246:119-127.
 Henner et al. (1986) *Gene* 49:147-152.
 Potrykus (Jun. 1990) *Bio/Technology* 8:535-542.
 Comai, et al (1988) *Journal of Biological Chemistry* 263:15104-15109.
 Fitzgibbon (Dec. 1988) Ph.D. Thesis University Microfilms International, 1989, pp. viii-ix, 18, 22-29, 32, 93, 96-108.

Primary Examiner—Che S. Chereskin*Attorney, Agent, or Firm*—Dennis R. Hoerner, Jr.

[57]

ABSTRACT

Genes encoding Class II EPSPS enzymes are disclosed. The genes are useful in producing transformed bacteria and plants which are tolerant to glyphosate herbicide. Class II EPSPS genes share little homology with known, Class I EPSPS genes, and do not hybridize to probes from Class I EPSPS's. The Class II EPSPS enzymes are characterized by being more kinetically efficient than Class I EPSPS's in the presence of glyphosate. Plants transformed with Class II EPSPS genes are also disclosed as well as a method for selectively controlling weeds in a planted transgenic crop field.

87 Claims, 70 Drawing Sheets